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CONTRACT [ ]

25X1

PAR 226
1 June 64

SUBJECT: Analysis of Photographic Images to Evaluate System Performance

TASK/PROBLEM

1. To provide a more useful technique for evaluating photographic systems by using data obtained from microdensitometer scanned edges.

DISCUSSION

2. Edge data on Missions 1004-1, 1004-2, 4005, and 4006 have been traced, data reduced, and reports written. Each report covered:

a. Introduction

b. A summary, listing the average value, the standard deviation, and the coefficient of dispersion.

c. A listing of the description, location and image quality rating of each edge scanned.

d. Frequency plots of computer resolving power and line spread function width.

e. A grid for position identification of edges.

3. Mission 4006 was found to be similar in image quality to 4003 and better than the other 4000 Missions. Very few edges in Mission 4005 were found suitable for edge tracing and they were the poorest quality measured to date confirming the degrading effect of the attitude instability that was present in this case. Edges from Mission 1004-1 and 1004-2 had the highest quality of any CMJ data measured to date, approximately 40% better than the average of previous J and C Missions.

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Declass Review by NGA.

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4. Using the image quality date collected on Missions 1004-1 and 1004-2, several comparisons were studied:

a. Forward vs. aft cameras (similar quality),

b. Snow covered scenes vs. snow (20% higher resolution and 10% narrower spread function width in the areas having no snow) and,

c. Effect of edge orientation on image quality (no correlation).

5. A system for unattended night processing of edge trace data has been worked out for use on the IBM 1620 computer. Data from Mission 4006 was successfully reduced by this method. Another computer program to determine the line spread function width (at 50% amplitude) from the derivatives has been written and is now in use.

6. A study is in progress of the hardware needed to provide punched card output from a hand-smoothed microdensitometer trace by the use of a curve follower. It appears that the equipment can be obtained as "plug in" units, either by purchase or rental. Arrangements have been made to have this equipment on a loan basis, without cost, for a period of one week.

PLANNED ACTIVITIES

7. Since this PAR was initiated to cover Mission work for an interim period only, no further activity will be undertaken nor a final report submitted unless some specific extension of this work is directed by the Contracting Officer.

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